

CLAIMS

1. A metal-containing web for use in a liquid-based etch process to make product units, comprising:

an elongated substrate having first and second opposing surfaces;

a first metal-containing layer disposed upon the first surface of the substrate;

a first etch-resistant layer disposed upon the first metal-containing layer, the first etch-resistant layer having a first pattern substantially defining at least a part of at least a first functional feature of the product unit;

a second metal-containing layer disposed upon the second surface of the substrate; and

a second etch-resistant layer disposed upon the second metal-containing layer in register with the first etch-resistant layer, the second etch-resistant layer having a second pattern substantially defining at least the first functional feature part.

2. The web of claim 1 wherein the first and second metal-containing layers are of equal thickness.

3. The web of claim 1 wherein the first and second metal-containing layers are of unequal thickness.

4. The web of claim 1 wherein the first and second patterns comprise mirror image areas at least where the first functional feature part is defined.

5. The web of claim 1 wherein the first pattern further defines a second functional feature of the product unit.

6. The web of claim 1 wherein:

the first pattern further substantially defines at least part of a second functional feature of the product unit; and

the second pattern further substantially defines the second functional feature part.

7. The web of claim 1 wherein the first and second metal-containing layers comprise aluminum foil.

8. The web of claim 1 wherein the first and second metal-containing layers comprise deposited aluminum-containing material.

9. The web of claim 1 wherein the first and second metal-containing layer comprise copper foil.

10. A metal-containing web for use in a liquid-based etch process to make a planar speaker diaphragm, the planar speaker diaphragm having at least one circuit trace having functional areas for interacting with an externally imposed magnetic field, comprising:

an elongated substrate having first and second opposing surfaces;

a first metal foil layer disposed upon the first surface of the substrate;

a first etch-resistant layer disposed upon the first metal foil layer, the first etch-resistant layer having a first pattern defining at least the functional areas of the circuit trace;

a second metal foil layer disposed upon the second surface of the substrate; and

a second etch-resistant layer disposed upon the second metal foil layer in register with the first etch-resistant layer, the second etch-resistant layer having a second pattern defining at least the functional areas of the circuit trace.

11. The web of claim 10 wherein the first and second patterns comprise mirror image areas at least where the functional areas of the circuit trace are defined.

12. The web of claim 11 wherein the first and second metal foil layers are of equal thickness.

13. The web of claim 12 wherein:

the first pattern further defines the circuit trace in entirety; and

the second pattern further defines the circuit trace in entirety.

14. The web of claim 10 wherein:

the first pattern further defines the circuit trace in entirety;

the second pattern further defines the circuit trace in entirety; and

the first and second patterns comprise mirror image areas at least where the circuit trace is defined.

15. The web of claim 14 wherein the first and second metal foil layers are of equal thickness.

16. The web of claim 10 wherein:

the circuit trace is a main range circuit; and

the first pattern further defines a tweeter circuit trace.

17. A metal-containing web for use in a liquid-based etch process to make an electronic circuitry surveillance device, the electronic circuitry surveillance device having at least one circuit trace having at least one inductor functional area and at least first and second charge storage functional areas, comprising:

an elongated substrate having first and second opposing surfaces;

a first metal foil layer disposed upon the first surface of the substrate;

a first etch-resistant layer disposed upon the first metal foil layer, the first etch-resistant layer having a first pattern defining at least the inductor functional area and the first charge storage functional area;

a second metal foil layer disposed upon the second surface of the substrate; and

a second etch-resistant layer disposed upon the second metal foil layer in register with the first etch-resistant layer, the second etch-resistant layer having a second pattern defining at least the inductor functional area and the second charge storage functional area.

18. The web of claim 17 wherein the first and second patterns comprise mirror image areas at least where the inductor functional area is defined.

19. The web of claim 17 wherein the first and second metal foil layers are of equal thickness.

20. The web of claim 10 wherein the first pattern further defines a fusible link functional area.

21. A planar speaker diaphragm comprising:

a substrate having first and second opposing surfaces; and

at least one circuit trace, the circuit trace having a first metal-containing part disposed upon the first surface of the substrate and a second metal-containing part disposed upon the second surface of the substrate in a substantially opposing relationship.

22. The planar speaker diaphragm of claim 21 wherein the circuit trace terminates at each end thereof in a respective bonding pad.

23. An electronic circuitry surveillance product comprising:

a substrate having first and second opposing surfaces;

an inductor trace, the inductor trace having a first metal-containing part disposed upon the first surface of the substrate and a second metal-containing part disposed upon the second surface of the substrate in a substantially opposing relationship;

a first charge storage patch disposed upon the first surface of the substrate and coupled to the inductor trace;

a variable impedance element disposed upon the second surface of the substrate and having a first end and a second end, the first end of the variable impedance element being coupled to the inductor trace; and

a second charge storage patch disposed upon the second surface of the substrate and coupled to the second end of the variable impedance element.

24. The electronic circuitry surveillance product of claim 23 wherein the variable impedance element comprises a fuse trace.

25. A method for demetallizing a web to make a product unit, comprising:

applying a first etch-resistant pattern to a first metal-containing layer of the web, the first metal-containing layer being disposed on a first surface of a substrate of the web, and the first pattern substantially defining at least a part of at least a first functional feature of the product unit;

applying a second etch-resistant pattern to a second metal-containing layer of the web, the second metal-containing layer being disposed on a second surface of the substrate opposite the first surface, and the second pattern substantially defining at least the first functional unit part;

exposing both sides of the web to a liquid etchant to effect removal of metal-containing material from areas of the web not protected by the first and second etch-resistant patterns; and

washing the etchant from the web.

26. The method of claim 25 wherein the exposing step comprises continuously passing the web in an immersed condition through a bath of liquid etchant.

27. The method of claim 25 wherein the exposing step comprises exposing the web to sprays of liquid etchant.

28. A method of effecting selective demetallization of a web containing a flexible substrate layer, the method comprising:

applying a first patterned layer of sodium hydroxide-resistant material to a first aluminum layer disposed on a first surface of the substrate, the first patterned layer substantially defining at least a part of at least a first functional feature of the product unit;

applying a second patterned layer of sodium hydroxide-resistant material to a second aluminum layer of the web disposed on a second surface of the substrate, the second surface of the substrate being opposite the first surface and the second patterned layer substantially defining at least the first functional feature part;

continuously passing the web in an immersed condition through a bath of aqueous sodium hydroxide based solution to effect removal of aluminum from areas of the web not protected by the first and second patterned layers; and

washing the first and second aluminum layers free from spent sodium hydroxide based solution.